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**REMARKS**

Claims 1-8, 12-22, and 24-42 are currently pending in the subject application and are presently under consideration. Claims 19 and 22 have been amended herein. A listing of all claims is found on pages 2-8 of this Reply.

Favorable reconsideration of the subject patent application is respectfully requested in view of the comments and amendments herein.

**I. Objection to the Specification**

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter of claims 19 and 22, as previously amended to set forth the limitations "to extend motorized system lifetime for a predetermined time," and "to increase motorized system life duration to a specific temporal point," respectively. Claims 19 and 22 have been amended to set forth "to extend motorized system lifetime to a specific time horizon." Therefore, it is respectfully requested that this objection be withdrawn.

**II. Rejection of Claims 19-22 and 24-35 Under 35 U.S.C. §112, First Paragraph**

Claims 19-22 and 24-35 stand rejected under 35 U.S.C. §112, First Paragraph, as failing to comply with the written description requirement. This rejection should be withdrawn for at least the following reasons. Independent claims 19 and 22 have been amended herein, as set forth above in Section I. The subject amendments are believed to remove the grounds for the rejection under 35 U.S.C. §112, First Paragraph. Accordingly, withdrawal of this rejection is respectfully requested.

**III. Rejection of Claims 19-22 and 24-35 Under 35 U.S.C. §112, Second Paragraph**

Claims 19-22 and 24-35 stand rejected under 35 U.S.C. §112, Second Paragraph, as being indefinite for failing to point out and distinctly claim subject matter which applicants regard as the invention. This rejection should be withdrawn for at least the following reasons. The amendments made to independent claims 19 and 22, discussed above in Section I, are believed to remove the grounds for the instant rejection. Accordingly, withdrawal of this rejection is respectfully requested.

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**IV. Rejection of Claims 1, 19, and 22 Under 35 U.S.C. §102(e)**

Claims 1, 19, and 22 stand rejected under 35 U.S.C. §102(e) as being anticipated by McConnell *et al.* (U.S. 6,002,232). Withdrawal of this rejection is respectfully requested for at least the following reasons. McConnell *et al.* does not disclose each and every aspect of the present invention as set forth in the subject claims.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the...claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The present invention relates to systems and methods for controlling and diagnosing the health of a machine, and more particularly, to systems and methods for controlling and diagnosing motorized systems according to vibration, pressure, temperature, speed, and/or current analysis. Independent claim 1 sets forth "A method for controlling a motorized system comprising: measuring an attribute of the motorized system, the attribute comprises at least one of vibration, speed, temperature, pressure, and current in the motorized system; diagnosing a health of the motorized system based on the measured attribute; providing a diagnostics signal based on the diagnosed health; prognosing a state of the motorized system based at least in part on the at least one sensed attribute and/or the diagnosed state; providing a control signal based at least in part on the diagnosed health and the prognosed state; and providing a feedback operation that adjusts the control signal to extend the lifetime of the motorized system to a specific time horizon." Independent claims 19 and 22 recite similar aspects. The subject specification is replete with support for the amendment: for instance, according to an example described at pages 24-25, "...an appropriate *control signal 64* may be provided by the controller 71 to the motor drive 60 in order to avoid anticipated cavitation, *based on the diagnostics signal 72 (e.g., and/or the setpoint 19), whereby the service lifetime of one or more system components (e.g., pump 14) may be extended.* The control signal 64

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can further be provided to reduce cavitation to a prescribed low level to meet process constraints and *to extend machinery lifetime to a specific time horizon (e.g., to allow for mission completion).*" (Page 24, line 26 – page 25, line 3.) Moreover, "Subsequent diagnostics on the system with modified control *can confirm, in a feedback operation...whether a new, extended operating lifetime will be obtained.*" (Page 4, lines 20-23.) McConnell *et al.* does not describe such claimed aspects of the subject invention.

McConnell is directed toward suppressing vibration in a physical system *via* analysis of frequency spectra of a command input that is selected according to various parameters. The examiner contends that McConnell *et al.* describes the claimed aspect of "prognosing a state of the motorized system based at least in part on the diagnosed state," citing column 8, lines 42-50. However, the Examiner's cited section discusses selecting a command signal and evaluating a noise generation potential there for based on analysis of *a table lookup* of a frequency spectrum for the command signal, upon which aspect it appears the Examiner relies to describe prognosing a state of the system. If the analysis of the command signal attributes is satisfactory, then the command signal is applied to the system. *Only after application of the command signal* does McConnell *et al.* employ any diagnostic action. Thus, McConnell *et al.* does not disclose *prognosing a state of a motorized system based on a diagnosed state of the system, but rather discusses employing a predicted value as determined from a table lookup* to select a command signal that can be applied to a system to be diagnosed subsequently.

Additionally, McConnell *et al.* is silent with regard to the aspect of "*a feedback operation that adjusts the control signal to extend the lifetime of the motorized system to a specific time horizon,*" as set forth in the amended independent claims. Nowhere in the Examiner's cited sections or otherwise does McConnell *et al.* even mention a feedback operation that adjusts a control signal to control system lifetime duration.

"Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Mehl/Biophile Int'l Corp. v. Milgraum*, 192 F.3d 1362, 1365, 52 USPQ2d 1303, 1305 (Fed. Cir. 1999), reh'g denied, 1999 U.S. App. LEXIS 31386 (Fed. Cir. Oct. 37, 1999) (*quoting In re Oelrich*, 666 F.2d 578, 581, 212 USPQ323, 326 (CCPA 1981)).

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The Examiner contends that the claimed aspect of adjusting a control signal to extend system lifetime to a specific time horizon is inherent to the McConnell reference because McConnell *et al.* relates to vibration reduction and because unwanted vibrations reduce the lifetime of system components. The Examiner further points to Madhavan to illustrate that such would be understood by one skilled in the art. Still furthermore, the Examiner contends that by reducing vibrations, McConnell *et al.* inherently extends the lifetime of the motorized system to a specific time horizon, where a "specific time horizon" is interpreted broadly as referring to the time when the system will fail to operate consistently, predictably, or accurately, citing a definition from techdictionary.com.

The definition cited by the Examiner defines "time horizon" as "a point in time beyond which a system element will fail to process consistently..." The subject independent claims set forth a "specific time horizon," such as mission completion, *etc.*, to which system operation lifetime can be extended based on adjustments to a control signal that are facilitated by diagnoses and prognoses related to system health. McConnell *et al.* fails to describe such aspects of applicants' claimed invention. Moreover, the mere fact that a system can be calibrated to reduce vibration does not inherently disclose providing control signal adjustments that extend system operation lifetime to a *specific* time horizon.

In view of the foregoing, it is readily apparent that McConnell *et al.* does not anticipate or make obvious the applicants' invention as recited in the subject claims. Therefore, this rejection should be withdrawn.

**V. Rejection of Claims 1-5, 18-22, 24, 30, 35-38, 40 and 41 Under 35 U.S.C. §102(e)**

Claims 1-5, 18-22, 24, 30, 35-38, 40 and 41 stand rejected under 35 U.S.C. §102(e) as being anticipated by Madhavan (U.S. 6,004,017). Withdrawal of this rejection is respectfully requested for at least the following reasons. Madhavan does not disclose each and every aspect of the present invention as set forth in the subject claims.

As stated above with regard to Section IV, the subject independent claims set forth the aspect of *extending motorized system function until a specific time horizon is reached* based on diagnostic and prognostic information related to system health. As set

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forth with regard to McConnell *et al.*, Madhavan fails to disclose such aspects of the subject claims.

Madhavan merely discloses an algorithm for *predicting or avoiding* an episode of “chatter” in a machining tool. Chatter is a “self-excited relative vibration between the workpiece and the cutting tool in common machining processes such as turning processes on a lathe...” (Column 1, lines 30-33.) Madhavan does not disclose *adjusting a control signal to extend operating life to a specific time horizon* as set forth in the subject independent claims. As with McConnell *et al.*, the Examiner relies on an inherency argument to introduce the claimed aspect of the specific time horizon, contending that the stated object of the Madhavan invention is to extend the lifetime of a system, which the Examiner states, is equivalent to the claimed aspect of extending system lifetime operation to a specific time horizon. However, as stated above, the mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency.

Thus, Madhavan fails to anticipate or make obvious applicants’ invention as set forth in independent claims 1, 19, 22, and 36 (and claims 2-5, 18-22, 24, 30, 35-38, and 40-41, which depend respectively there from). This rejection should be withdrawn.

**VI. Rejection of Claims 6-8, 12-14, 25-29, and 42 Under 35 U.S.C. §103(a)**

Claims 6-8, 12-14, 25-29, and 42 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Madhavan (U.S. 6,004,017) in view of Hays *et al.* (U.S. 6,260,004). This rejection should be withdrawn for at least the following reasons. Neither Madhavan nor Hays *et al.*, alone or in combination, teach or suggest all of the claimed aspects of the present invention as set forth in the subject claims.

To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) *must teach or suggest all the claim*

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*limitations. See MPEP §706.02(j). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. See In re Vaack, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added).*

As discussed above, independent claims 1, 22, and 36 set forth the aspect of a *feedback operation that adjusts a control signal to manipulate system lifetime duration*. Neither of the Examiner's cited references teaches or suggest such aspect of the claimed invention, as discussed above in Sections IV and V.

Accordingly, it is readily apparent that neither Madhavan nor Hays *et al.*, alone or in combination, teach or suggest all of the claimed aspects of independent claims 1, 22, and 36 (and claims 6-8, 12-14, 25-29, and 42, which depend respectively there from). Withdrawal of this rejection is respectfully requested.

**VII. Rejection of Claims 15-17, and 31-34 Under 35 U.S.C. §103(a)**

Claims 15-17 and 31-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Madhavan (U.S. 6,004,017) in view of Edison *et al.* (5,586,305). Withdrawal of this rejection is respectfully requested for at least the following reasons. Neither Madhavan nor Edison *et al.*, alone or in combination, teach or suggest the present invention as set forth in the subject claims.

Claims 15-17 and 31-34 depend from independent claims 1 and 22 respectively. As discussed above in Sections IV-VI, Madhavan does not teach or suggest "*a feedback operation that adjusts the control signal to extend the lifetime of the motorized system to a specific time horizon*" as set forth in independent claims 1 and 22. Edison *et al.* fails to overcome the deficiencies of Madhavan and McConnell *et al.* with respect to the subject independent claims.

In view of the above comments, it is respectfully submitted that the combination of Madhavan and Edison *et al.* does not make obvious the subject invention as recited in independent claims 1 and 22 (and claims 15-17 and 31-34 which respectively depend there from). Therefore, this rejection should be withdrawn.

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**VIII. Rejection of Claim 39 Under 35 U.S.C. §103(a)**

Claim 39 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Madhavan (U.S. 6,004,017) in view of Grayson *et al.* (U.S. 5,111,531). Withdrawal of this rejection is respectfully requested for at least the following reasons. Claim 39 depends from independent claim 36, which, as discussed above in Section V, is not made obvious by Madhavan. Grayson *et al.* fails to overcome the deficiencies of Madhavan with respect to independent claim 36. Specifically, Grayson *et al.* does not teach or suggest a diagnostics system that *"ensures that the motorized system will function until a predetermined time horizon is reached."*

Accordingly, this rejection should be withdrawn.

**CONCLUSION**

The subject application is believed to be in condition for allowance in view of the above comments and amendments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063.

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,

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